

## Note

### *Megathyrus*, a new generic name for *Panicum* subgenus *Megathyrus*

The pasture grass *Panicum maximum* Jacq. and its many cultivars are widely known in the tropics and subtropics as pasture grasses, that have also become environmental weeds in many places. This species, together with a lesser known African species *P. infestum*, is unique among all other *Panicum* species in having a transversely rugose upper lemma and palea together with the fact that it is a C<sub>4</sub> grass with a PCK physiological subtype of the Kranz syndrome (Brown 1977, Ellis 1988). For the first of these reasons the species was placed in a separate unranked group *Maxima* (Hitchcock and Chase 1910), assigned sectional rank by Stapf (1920) and Pilger (1931) and a separate subgenus *Megathyrus* (Pilger 1931). Its distinctness was corroborated by discovery of its C<sub>4</sub> status.

The genus *Panicum* is currently the largest genus of the Poaceae, with about 600 species of worldwide distribution (Zuloaga 1987). Historically the genus has had an even larger number of species, mostly because of a considerable number of genera of the tribe Paniceae had their nomenclatural origins in the genus *Panicum*. Nevertheless, even though many large genera were separated from *Panicum* when the floras and accounts of the tropical and subtropical regions were written in the 19<sup>th</sup> century (Palisot de Beauvois 1812) and first half of the 20<sup>th</sup> century (Chase 1911, Stapf 1920, Stapf & Hubbard 1930–1934, Hughes 1923), the residual taxa remaining in the genus, after these major splits, still results in a polyphyletic *Panicum* (Zuloaga *et al.* 2000). Since the major splits from *Panicum* referred to above, there have been some nomenclatural changes, particularly in the New World (Zuloaga 1987, Zuloaga *et al.* 2000, Aliscioni *et al.* 2003), to accommodate the non-monophyletic situation in *Panicum*, although this position has not been universally accepted (Webster 1988). Of the six subgenera of *Panicum* from the New World recognised by Zuloaga (1987) (*Panicum*, *Agrostoides*, *Megathyrus*, *Phanopyrum*, *Dichantheium* and *Steinchisma*) the last three have been recognised as valid genera by

various authors, and currently followed for the New World (Barkworth 2003, Soreng *et al.* (ongoing), Aliscioni *et al.* 2003).

Webster (1987), in his treatment of Australian Paniceae transferred *Panicum maximum* and all species of *Brachiaria*, except *Brachiaria eruciformis*, to the genus *Urochloa* on the basis of common features of “numerous spikelet, vegetative and anatomical characters”. Zuloaga *et al.* (2000) and Wipff & Thompson (2003) support Webster’s decision. The spikelet characters were not specifically mentioned by Webster but they presumably refer to the transverse rugose surface of the upper lemma and palea. On the basis of chloroplast molecular data Giussani *et al.* (2000) and Aliscioni *et al.* (2003), using the *ndhF* gene and Gomez-Martinez and Culham (2000) using the *trnL-F* gene, suggest that *Panicum* subgenus *Megathyrus* is a sister clade to *Urochloa* or *Brachiaria s.l.*. A closer examination of the cladogram, based on morphological data, presented by Zuloaga *et al.* (2000) suggests that they likewise have support for *Panicum maximum* as a sister to *Urochloa*. The data they present do not support inclusion of *P. maximum* in *Urochloa* though, and perhaps they were really more interested in demonstrating its misplacement in *Panicum* and its affinities than in its correct position. In fact if *P. maximum* was included in *Urochloa* using their data, the genus would have to be expanded to include *Eriochloa*, an option that no one has suggested seriously to date. The recent phylogenetic studies of the panicoid grasses based on molecular data using the chloroplast gene *ndhF* by Giussani *et al.* (2001) and Aliscioni *et al.* (2003), results in a phylogeny in which the polyphyletic nature of *Panicum* is well illustrated in their cladograms, with *Panicum* placed throughout the  $\chi=9$  and  $\chi=10$  clades. *Panicum maximum* (as *Urochloa maxima*) is placed with species of *Urochloa* (sensu Webster), and *Melinis*, *Chaetium* and *Eriochloa* are also embedded in the same clade. This even broader interpretation of *Urochloa* seems even less likely to be acceptable.

The open panicle inflorescence of *Panicum maximum* is found in most other species of *Panicum*, and is a very strong morphological indication that the species should not be transferred to either *Bracharia* (Brown 1977, Gutierrez *et al.* 1976) or *Urochloa* (Webster 1987), which both have a strict panicle inflorescence (raceme of racemes). Webster's transfer of most species of *Bracharia* to *Urochloa* has been widely accepted worldwide (Ashalatha 1997, Davidse 1994, Jacobs & Wall 1993, Macfarlane 1992, Morrone *et al.* 1992, Veldkamp 1996b, Wheeler *et al.* 2002, Wipff & Thompson 2003) with the exception of the African floras (Clayton & Renvoize 1982, Clayton 1989, Gibbs-Russell *et al.* 1990), some tropical and South American books (Davidse 1994, Renvoize 1998) and the recent interactive key to Australian grasses (Sharp & Simon 2002). The transfer of *Panicum maximum* to *Urochloa* has not been accepted as readily (Jacobs & Wall 1993, Macfarlane 1992, Morrone *et al.* 1992, Veldkamp 1996a, Wheeler *et al.* 2002). The possession of the PCK C<sub>4</sub> Kranz subtype of leaf anatomy and photosynthetic subtype by *P. maximum* indicates that the retention of the species in the genus *Panicum* does not reflect its relationships well there either.

A solution is to raise the subgeneric name *Megathyrsus* to generic rank, following the trend set by other authors with the genera *Phanopyrum* (Raf.) Nash, *Dichantherium* (Hitchc. & Chase) Gould and *Steinchisma* Raf. It is considered appropriate to do this at this time so that the new names can be included in the Flora of Australia account of the panicle grasses.

The genus *Megathyrsus* as currently circumscribed, is limited to the two species, *M. maximus* and *M. infestus*. Previous authors have included within this subgenus other species, both with transversely rugose upper lemmas and paleas (*P. bulbosum* H.B.K. *fide* Hsu 1965) and without the rugose lemmas and paleas (*P. trichocladum* K. Schum, *P. monticola* Hook.f. as *P. transvenulosum* Stapf and *P. funaense* Vanderyst as *P. spongiosum* Stapf *fide* Stapf 1920), but none of these possess the PCK C<sub>4</sub> Kranz subtype of leaf anatomy and

photosynthetic subtype, and they are accommodated elsewhere in the genus *Panicum*. There is even molecular evidence that *P. bulbosum* is really a species of *Setaria* (Giussani *et al.* 2001), although, at this stage there is no supporting morphological evidence to back this discovery.

***Megathyrsus*** (Pilger) B.K.Simon & S.W.L. Jacobs, **stat. nov.**

*Panicum* subgenus *Megathyrsus* Pilg.,  
Notizbl. Bot. Gart. Berlin-Dahlem 104:242  
(1931).

*Panicum* sect. *Maxima* Hitchc. & Chase ex  
Pilg. Notizbl. Bot. Gart. Berlin-Dahlem 104:  
242 (1931).

*Panicum* sect. *Maximae* Stapf, Fl. Trop. Afr.  
9(4): 639, 642 (1920), in part

*Panicum* (unranked group) *Maxima* Hitchc.  
N. Amer. Fl. 3(2): 200, 203 (1915).

***Megathyrsus maximus*** (Jacq.) B.K.Simon &  
S.W.L. Jacobs, **comb. nov.**

*Panicum maximum* Jacq., Ic. Pl. Rar. 1: 2, t. 13  
(1781); *Urochloa maxima* (Jacq.)  
R.D.Webster, Austral. Paniceae 241 (1987).  
**Type:** Guadeloupe, Lesser Antilles,  
*N.J.Jacquin* (holo:W; iso: BM), *fide*  
F.O.Zuloaga, Darwiniana 22: 24 (1979).

For a complete synonymy of the species see  
Clayton & Renvoize (1982) and Tropicos ([http://  
mobot.mobot.org/W3T/Search/vast.html](http://mobot.mobot.org/W3T/Search/vast.html))

***Megathyrsus maximus* var. *pubiglumis***  
(K.Schum) B.K.Simon & S.W.L. Jacobs,  
**comb. nov.**

*Panicum maximum* var. *pubiglume* K.Schum.,  
in Engl., Pflanzenwelt Ost-Afrikas 85  
(1895) as "*pubiglumis*". **Type:** West  
Usambara, Mashewa, Tanzania, *Holst*  
8716 (lecto: B, isolecto: K), *fide*  
J.F.Veldkamp, Blumea 41:197 (1996).

*Panicum maximum* Jacq. var. *trichoglume*  
Robyns, Mem. Inst. Roy. Colon. Belge,  
Sect. Sci. Nat. 1: 31 (1932). *Urochloa*

*maxima* var. *trichoglume* (Robyns) R.D.Webster, Austral. Paniceae 242 (1987)  
**Type:** Moanda, Cotier District, Zaire, Vanderyst 27725 (lecto: BR), *fide* J.F.Veldkamp, Blumea 41:197 (1996).

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**Megathyrus maximus** var. **coloratus** (C.T.White) B.K.Simon & S.W.L. Jacobs, **comb. nov.**

*Panicum maximum* var. *coloratum* C.T.White, Queensland Agricultural Journal 49: 112 (1938). **Type:** Lawnton, near Brisbane (cultivated), *F.B. Coleman* T.167 (holo: BRI).

**Megathyrus infestus** (Peters) B.K.Simon & S.W.L. Jacobs, **comb. nov.**

*Panicum infestum* Peters, Reise Mossamb., Bot. 2: 546. (1865). **Type:** Mozambique, Querimba, *Peters s.n.* (iso: K, n.v.), *fide* Clayton & Renvoize in Polhill, R.M. (ed). Flora of Tropical East Africa. Gramineae 3: 472 (1982).

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